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FLIP CHIP COMPONENTS

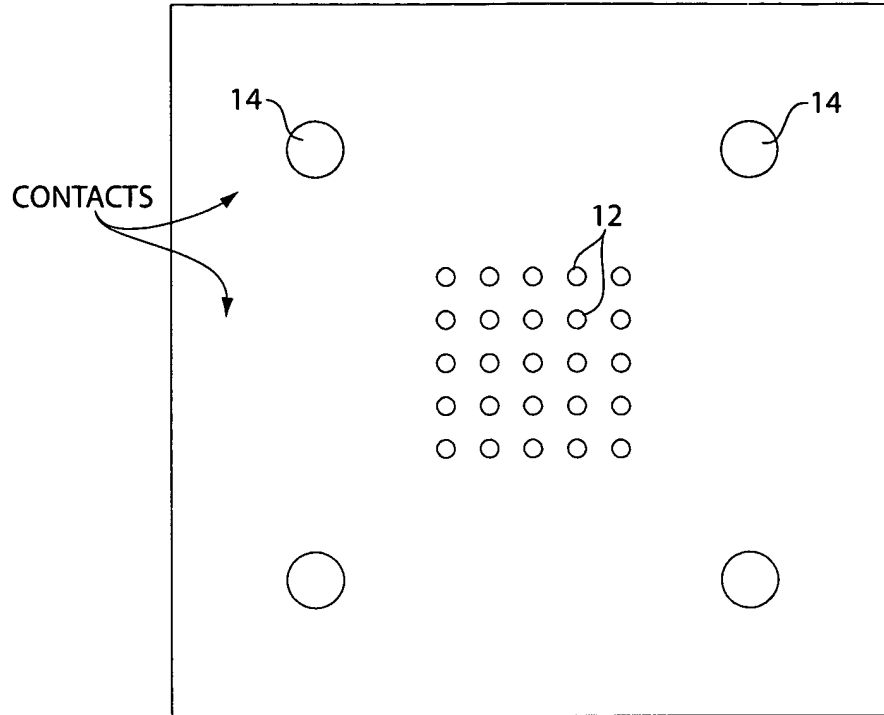


Fig. 1A

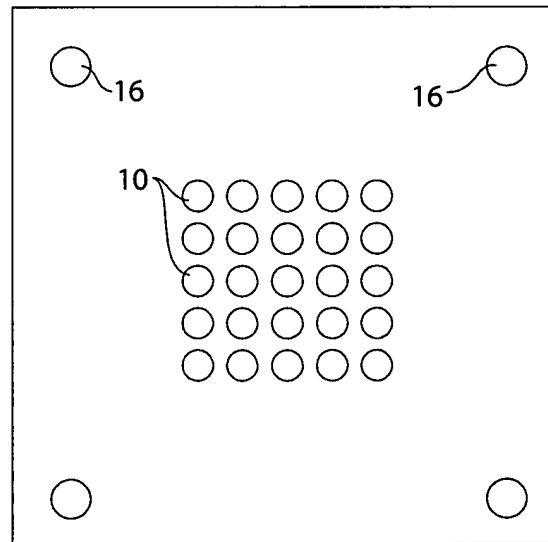


Fig. 1B



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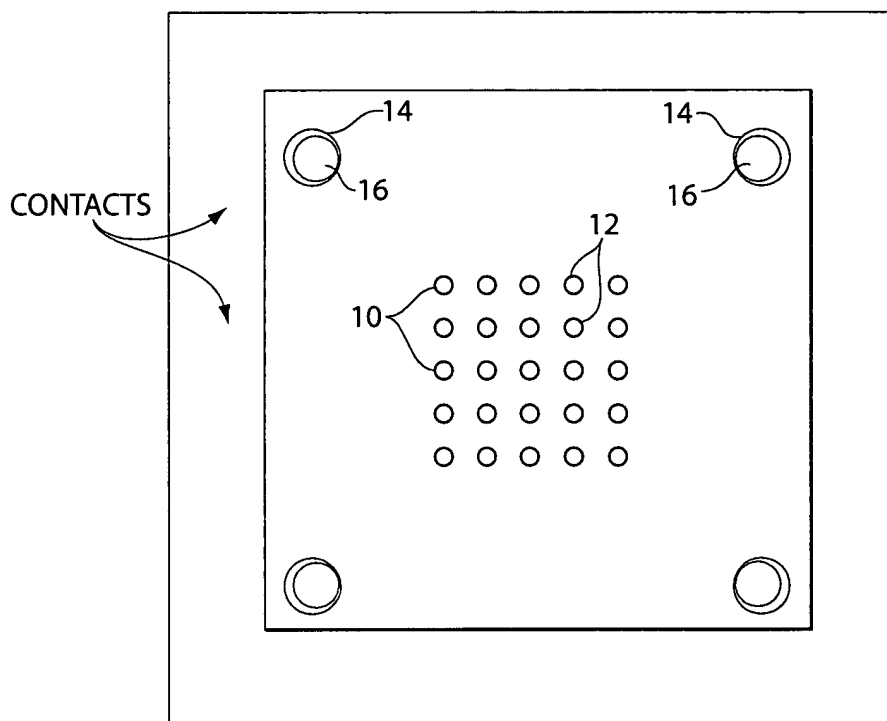


Fig. 2A



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FLIP CHIP ASSEMBLY DRAWING

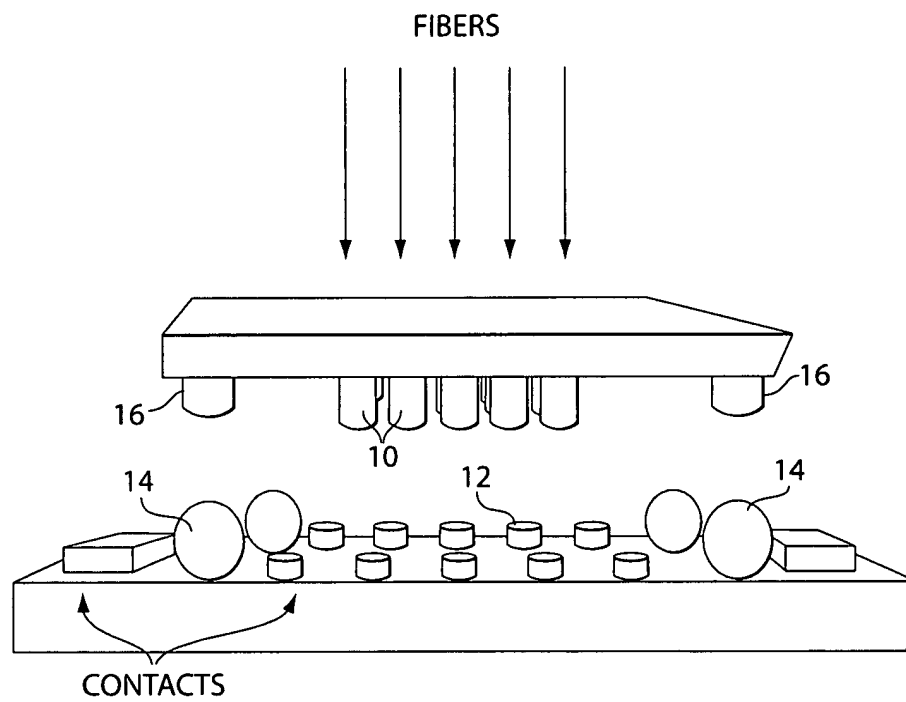
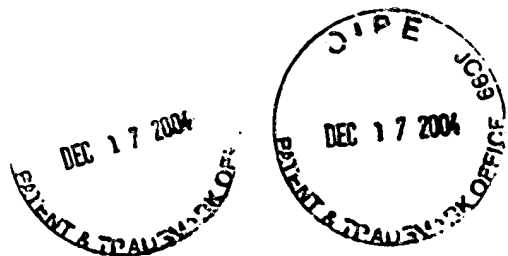


Fig. 2B



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METAL MICRONEEDLE FABRICATION PROCESS

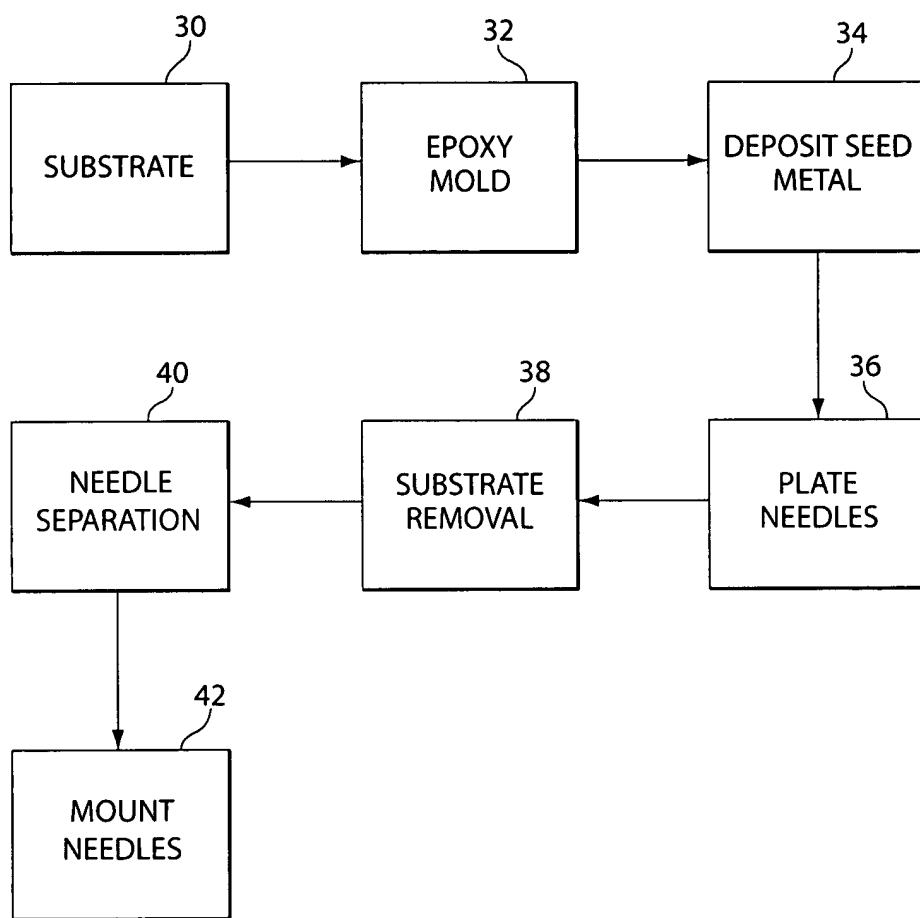


Fig. 3A



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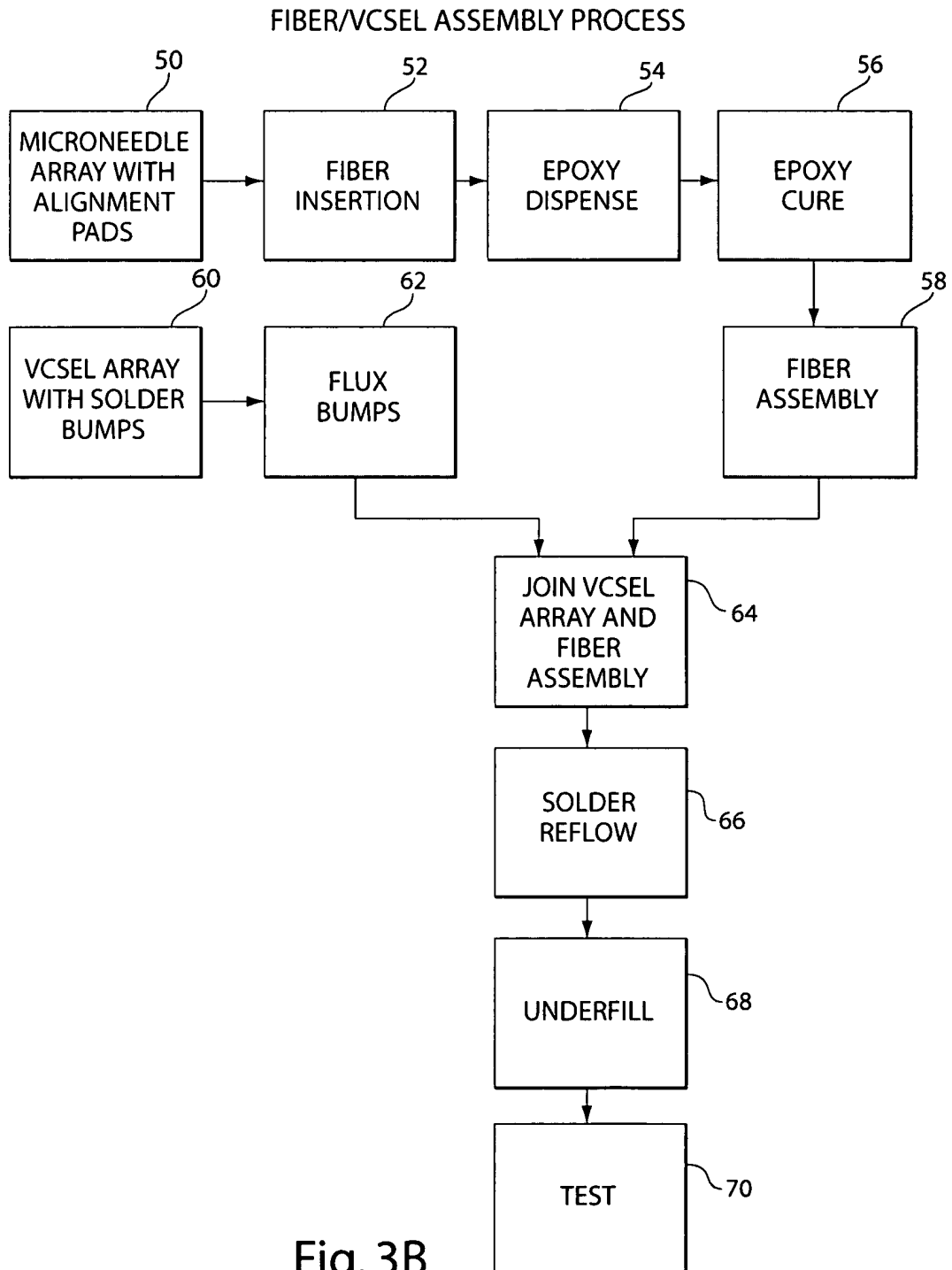


Fig. 3B



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FIBER IN NEEDLES

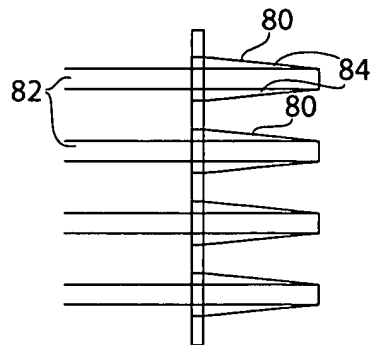


Fig. 4A

FIBER w/ EPOXY PLUG

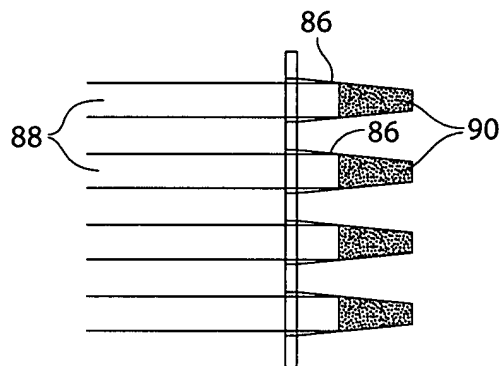


Fig. 4B

FIBER w/ EPOXY LENS

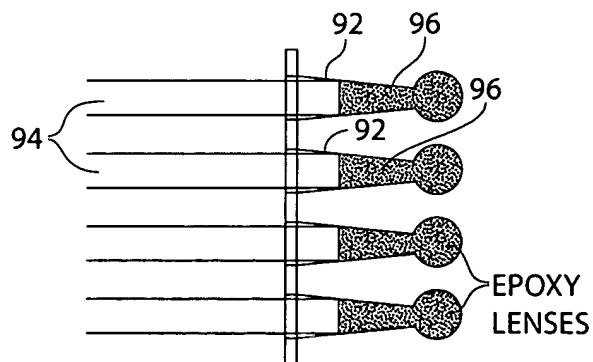


Fig. 4C



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FIBER w/ GRADED EPOXY LENS

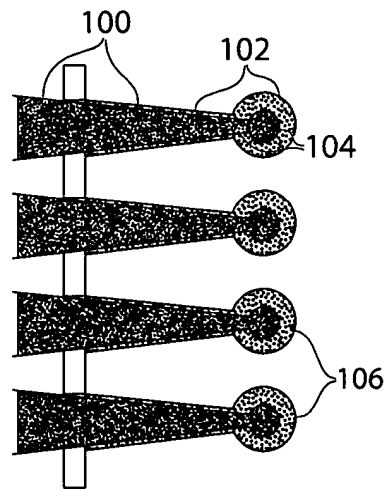


Fig. 5

MICRO-EXTRUSION

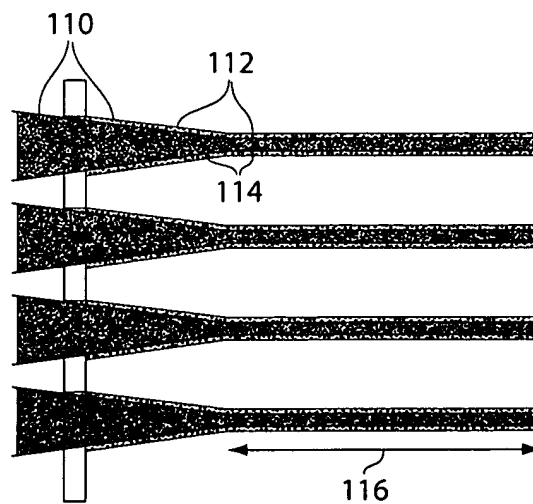


Fig. 6



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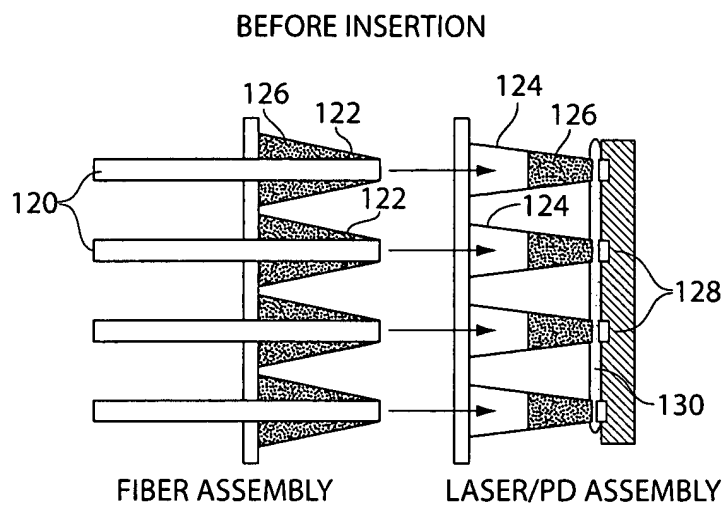


Fig. 7A

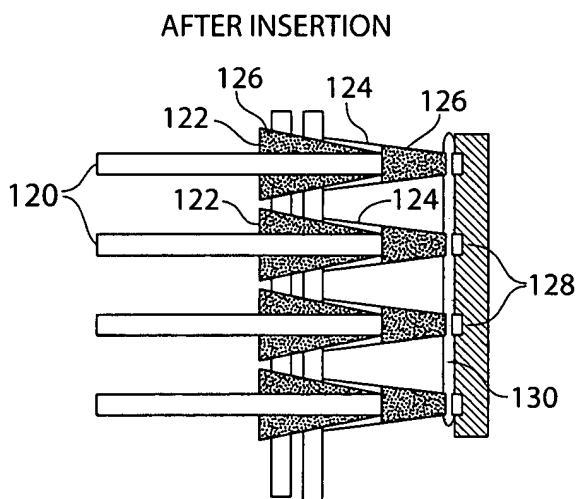


Fig. 7B

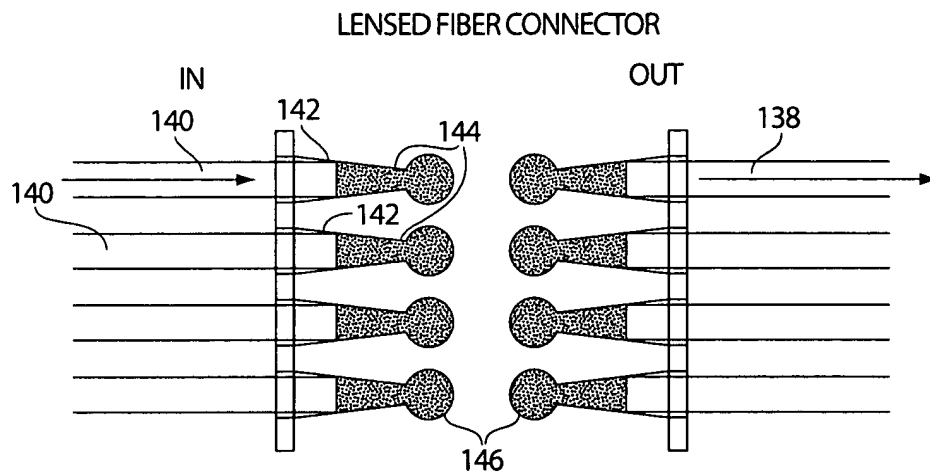


Fig.8

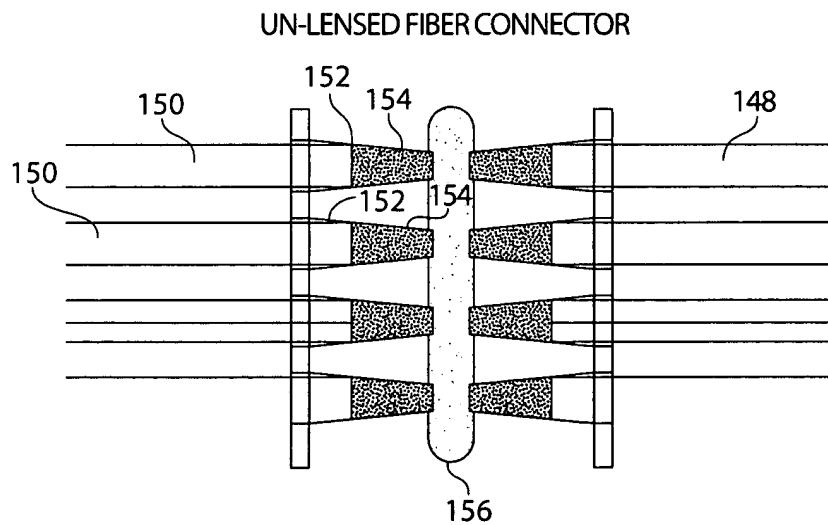


Fig.9



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LENSED FIBER CONNECTOR w/ ALIGNMENT SPACER

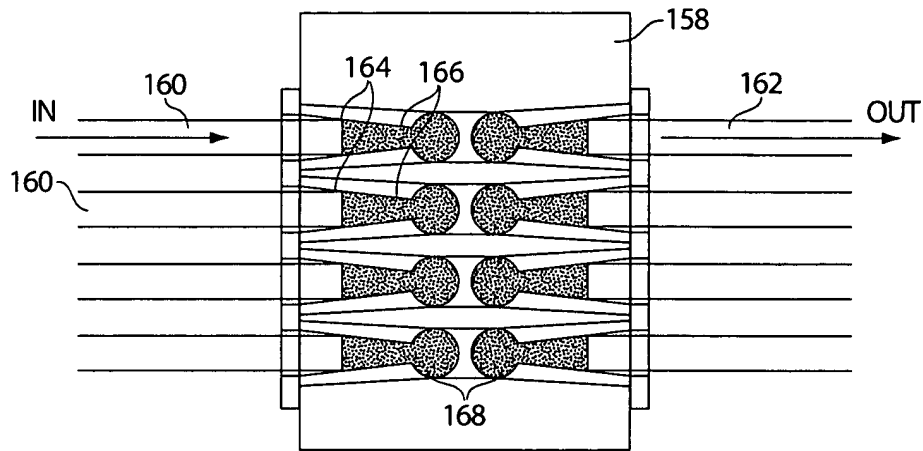


Fig.10

UN-LENSED FIBER CONNECTOR w/ ALIGNMENT SPACER

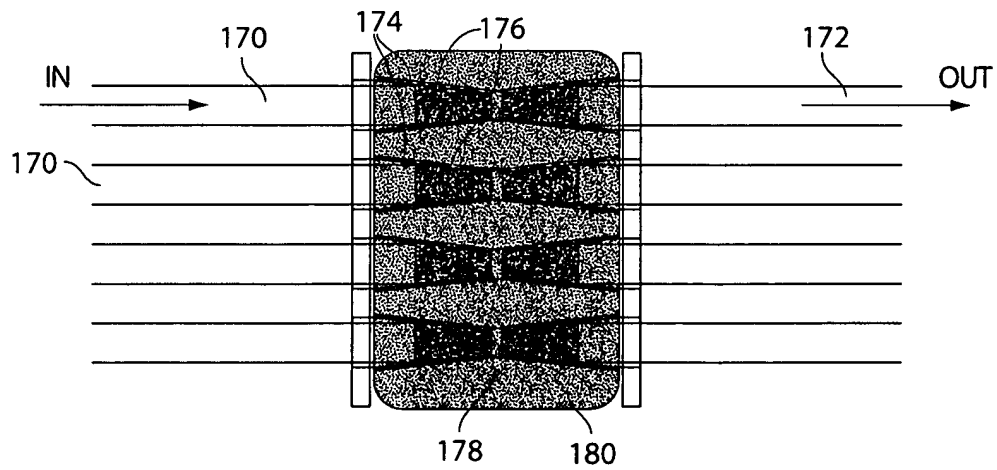


Fig.11



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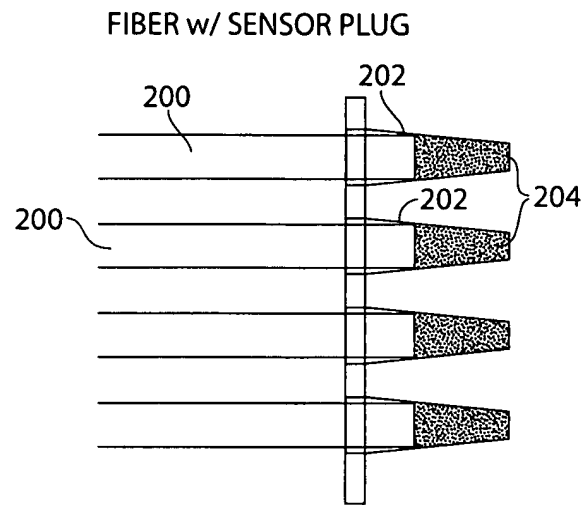


Fig. 12A

FIBER w/ LENS-SHAPED SENSOR ELEMENT

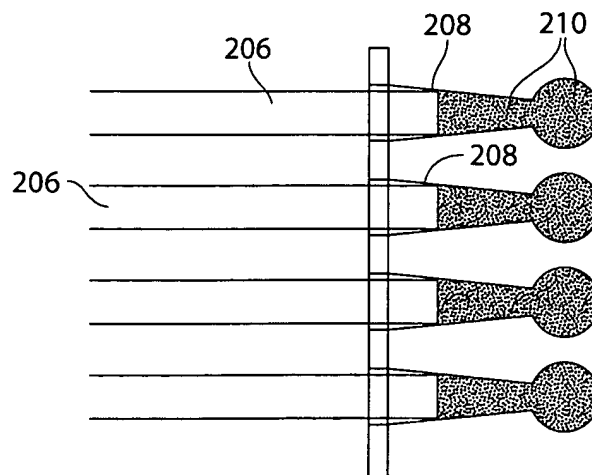


Fig. 12B



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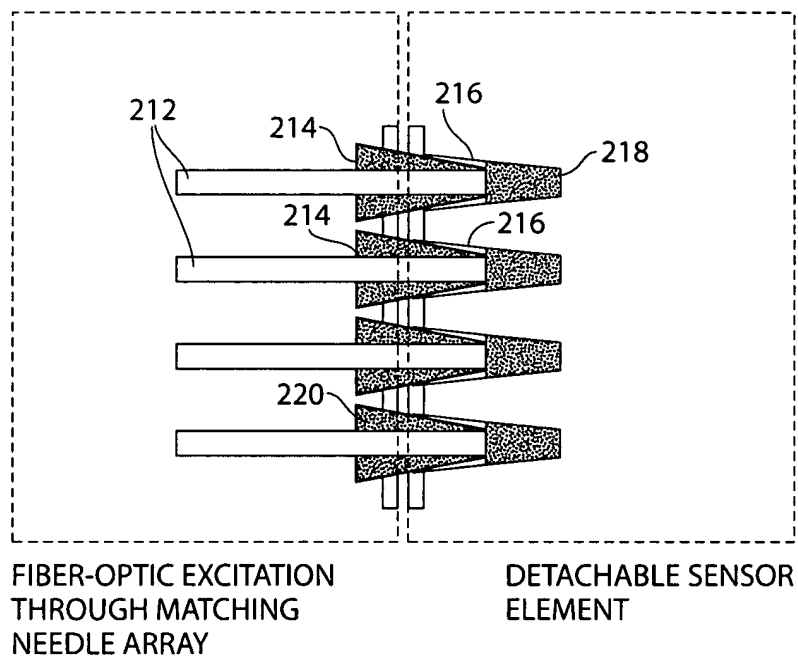


Fig. 12C